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Development of International Space Station to continue during STS-101

The development of the International Space Station will continue during NASA's second shuttle flight of the year when *Atlantis* is launched on the STS-101 mission, the 98th flight in Space Shuttle Program history.

"Our goal for STS-101, first and foremost, is to restore the operational and functional redundancy to the components of the space station that we have on orbit," said Phil Engelauf, STS-101 lead flight director.

Outfitted with a new "glass cockpit" and other state-of-the-art upgrades to key systems during an extensive modification period in Palmdale, California, *Atlantis* is scheduled to be launched from Complex 39-A at the Kennedy Space Center April 24 at the start of a 5-minute window. The precise launch time and duration of the launch opportunity will be narrowed within a week before the start of the mission to provide the best time for *Atlantis* to begin its two-day chase to catch up to the ISS.

Atlantis last flew in space in support of the STS-86 mission in 1997. With the "glass cockpit" upgrade, the electro-mechanical displays and instrumentation systems on board the vehicle were replaced with a complete, digitally-driven color panel. Similar to systems common in commercial airliners, the "glass cockpit" weighs less and has greater capabilities. All of the space shuttles will be upgraded with the "glass cockpit" by 2002, enabling future upgrades to a "smart cockpit."

Seven astronauts, led by veteran Commander Jim Halsell, will link up to the international outpost two days after launch and will spend six days docked to the ISS, four of which will be spent refurbishing and replacing components in both the Zarya and Unity modules.

Two crewmembers will perform a 6 1/2-hour space walk the day after docking – Flight Day 4. The first space-walking task will be to correct a problem with the U.S.

crane called the Orbital Replacement Unit Transfer Device or OTD, an element installed by the STS-96 crew during a space walk. The crane is attached to the top of Unity on the Pressurized Mating Adapter. It was learned in February that this crane was not locked properly to its socket.

"We actually discovered in reviewing still photos of the mission from STS-96 that this piece of hardware has been moving," said Engelauf. Photos reveal that this cargo crane has rotated from the point

where the crew left it. The STS-101 space walkers will release the crane from its socket, inspect it, reinstall it, and perform a test to ensure that it's fully connected.

Additional space-walking activities will be to install a Russian "Strela" cargo boom on the outside of Zarya, as well as replace a faulty radio antenna associated with the early communications system on Unity and perform several other tasks in advance of space walks on future station assembly missions. As time permits, eight handrails will be attached to the outside of Unity.

During the docked phase of the mission, three or four of six 800-ampere batteries in Zarya will be replaced. Zarya will receive additional new equipment including cooling fans, fire extinguishers, smoke detectors and an on-board tape recorder. In addition, a suspect radio frequency power distribution box (RFPDB) in Unity used as part of the early S-band communications system will be replaced while

Atlantis is linked to the new international facility.

Another chore that the crew will perform will be to use shuttle propellants to reboost the station. "We'll try to give the station enough altitude to support the planned rendezvous date with the Service Module in late July," said Engelauf.

Halsell, who is making his fifth flight into space and third as a commander, will be joined by veteran Pilot Scott Horowitz, who is making his third flight.

Mission Specialists include Dr. Mary Ellen Weber, making her second flight; Jeff Williams, making his first trip into space;

Jim Voss, embarking on his fourth flight; Susan Helms, making her fourth flight; and veteran Russian Cosmonaut Yuri Usachev, who is making his third flight into space and who has logged 376 days in space and six space walks during two previous missions aboard the Mir Space Station.

Usachev and fellow Cosmonaut Yuri Onufrienko hosted Astronaut Shannon Lucid during Usachev's second flight on the Mir. Lucid went on to set a U.S. single space flight endurance mark of 188 days on that mission.

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Parsons named JSC deputy director

William Parsons has been named deputy director of the Johnson Space Center. He previously served as director of Center Operations for JSC, a position he held since 1999.

Parsons' appointment by JSC Director George Abbey took effect March 6. In his new position, he will share responsibility for managing the overall activities of the center.

"During the next few years, the Johnson Space Center will be extremely busy completing assembly

of the International Space Station and preparing the first crews of astronauts for their tours on board," said Parsons. "I look forward to assisting JSC Director George Abbey with the myriad of responsibilities needed to achieve the goals of the center."

Parsons joined NASA at the Kennedy Space Center in 1990 where he held progressively responsible positions including serving as 2A manager of the Space Station Hardware Integration Office. In 1997, he was selected as the

engineering division chief in the Propulsion Test Directorate at the Stennis Space Center. He later served as the operations division chief in the Propulsion Test Directorate until he joined JSC as deputy director, Center Operations, in 1998.

Parsons holds a bachelor's degree in engineering from the University of Mississippi and a master's degree in engineering management from the University of Central Florida. ■



William Parsons



Scientist studies Yukon meteorite fragment.

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JASON XI focus is on extreme challenges.

Page 3



Students soar psychologically and scientifically.

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Yukon meteorite will allow glimpse into origins of life, universe

A meteorite that exploded over a remote area of northwest Canada in January will offer researchers a rare glimpse into the organic materials which "might have seeded life on Earth," said a NASA scientist who has begun analyzing some of the meteorite fragments.

JSC researchers have only begun to do their mineralogical analysis on fragments of the meteorite to determine its context with others that have fallen. "What we have discovered in this regard is that this is a very rare kind of meteorite called a carbonaceous chondrite," said Dr. Michael Zolensky, a cosmic mineralogist at JSC. "The last time one of these fell was in 1969 when two of them fell. So this is a once-in-a-generation type of occurrence to have this meteorite fall and be collected and analyzed.

"This is important because these kinds of meteorites are rich in organics. They contain pre-biotic organic materials such as amino acids and hydrocarbons which might have seeded life on Earth, and they also typically contain star dust including diamonds and silicon carbide that are survivors of the original cloud of dust and gas that made our solar system."

Carbonaceous chondrites, which comprise only about 2 percent of meteorites known to have fallen to Earth, contain many forms of carbon and organics, basic building blocks of life. They are typically difficult to recover because they easily break down during entry into Earth's atmosphere and during weathering on the ground.

JSC researchers received 10 egg-shaped chunks of the meteorite in mid-February. About a dozen additional pieces of the meteorite were delivered in early March. Only one of the initially received samples has been thawed; the rest are being kept frozen. "They have probably been frozen since they formed 4.5 billion years ago," said Zolensky.

The samples are in near-perfect condition. The location and timing of the fireball that streaked over a remote area of the Yukon Territory the morning of January 18, 2000, contributed to the scientific value of the samples. The frozen snow-covered ground of the Yukon provided near-ideal conditions for preservation. The finder, who has requested anonymity, collected the fragments in clean plastic bags and kept them continuously frozen. They were kept frozen until they arrived at JSC. "This is the first time that anybody has received such an uncontaminated meteorite," Zolensky said.

Scientists estimate that the meteoroid was 3 to 10 meters in diameter, making it

the largest object ever sampled for laboratory study.

Zolensky now has about a pound of meteorite fragments provided by the Canadian government and the University of Calgary. The finder loaned them to the Geological Survey of Canada's National Meteorite Collection of Natural Resources Canada (NRCan) and the University of Calgary, which then provided the samples, still frozen, to JSC for study and analysis. NASA is working closely with NRCan scientists and is providing results of the analysis to them.

as it was in space," said Zolensky.

The next step in the study of the fragments will be baseline analyses of the organics in the meteorite. This would require the destruction of some samples, and

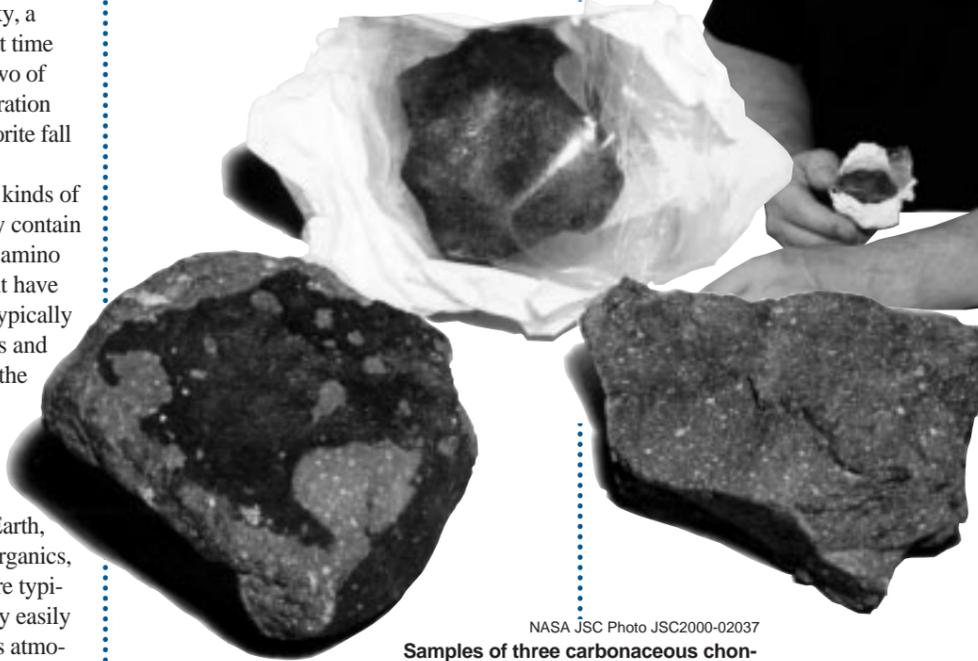
Canadian scientists are analyzing the fireball track to determine what the original orbit of this meteorite was around the sun. U.S.-based satellite detection systems imaged the meteorite as it fell. "So we may

actually be able to figure out where this meteorite came from for once, which would be unique for this kind of meteorite," said Zolensky.

Aside from their inherent scientific value, the samples are serving as a testbed of sorts for future sample return missions from Mars or Jupiter's moon Europa, Zolensky said. "One of the concerns in analyzing Martian samples is that we do not want to

contaminate any return samples with organics from the Earth, and we want to learn how to prevent that from happening. So here we have a chance to examine an uncontaminated meteorite. We can do some baseline analyses now. We can then do our best to curate it for a few years and then analyze it to see how good a job

Dr. Michael Zolensky, a NASA cosmic mineralogist, with a fragment of the Yukon meteorite. The meteorite exploded over the Yukon Territory on January 18, 2000, and a local resident collected several fragments for analysis. Samples of the meteorite are being analyzed at JSC at the request of the Geological Survey of Canada, Natural Resources Canada, which is borrowing them from the finder.



NASA JSC Photo JSC2000-02037

Samples of three carbonaceous chondrite meteorites that fell to Earth. Carbonaceous chondrites contain many of the building blocks of life. Left: Allende meteorite fell on Mexico in 1969. Center: Sample of Yukon meteor that exploded over Yukon Territory, Canada. Right: Murchison meteorite sample, which fell to Earth in Australia in 1969.

Scientific analysis of the fragments has just begun and results are only preliminary. In addition to conducting the mineralogical analysis, researchers have measured the induced radioactivity present in some of the samples.

Tests for induced radioactivity, which are being carried out by Dr. David Lindstrom at JSC, measure the object's exposure to space radiation. This radiation enters the objects and induces some radioactivity, which researchers can detect using gamma-ray counters. Samples from deep within the object in space are shielded from this cosmic ray exposure and are less radioactive, while pieces on outer parts of the object would have been more heavily bombarded and thus are more radioactive.

"By measuring the radiation of the fragments of the meteorite as we get them, we can tell where these pieces were in the object

negotiations are under way with the finder of the fragments for permission to do such tests.

To find out more about how the planets and

the sun were formed, researchers will look at the composition of the meteorite and the different isotopes for each element that is present. This data will tell researchers about the history of the atoms in the sample, how they came together, how the minerals originally formed, how they have been modified and how the sun has affected it. So the data will give researchers a history of the sun as well.

At JSC's request, and with the concurrence of the Canadian government, NASA's Dryden Flight Research Facility sent an ER-2 aircraft to sample the air in the vicinity of the fireball. Canadian scientists also gathered snow from local frozen lakes in an attempt to sample the dust shed from the fireball. These samples are now being examined at JSC.

we did in keeping it clean.

If we find that we didn't do a good job, then we could find how to do a better job. There is enough time to do that now to factor in how we would design a lab to analyze return Martian samples."

In addition to performing elemental, organic, and isotopic analyses on the meteorite, researchers may perform tests on it in the future that are as yet undetermined.

"One of the beauties of having actual samples on the ground to analyze is that you can tuck some of them away for a long time. In the future when new questions or techniques come along, you can pull out some samples and analyze them and learn more," Zolensky said. ■

Continued from Page 1

DEVELOPMENT

Usachev, Voss and Helms will return to the ISS next year as the second crew to live and work aboard the station. Permanent occupancy of the ISS is scheduled to begin in the fall by the Expedition One crew, William Shepherd, Yuri Gidzenko and Sergei Krikalev, who will be launched on a Russian Soyuz rocket from the Baikonur Cosmodrome in Kazakhstan.

Williams and Voss are the two space walkers during *Atlantis'* planned 10-day flight. Williams, who has no previous space-walking experience, will carry the designation of EV 1 during the planned excursion outside *Atlantis* and will wear the suit marked with red stripes on the elbows and the knees. Voss will be designated EV 2 and will wear the pure white suit. He conducted a space walk during the STS-69 mission in 1995 lasting almost seven hours.

The STS-101 mission originally was designed to follow the launch of the Zvezda Service Module as the flight to outfit the Russian component as the early living quarters for crews aboard the ISS. When Zvezda's launch was delayed, shuttle and station managers agreed to fly *Atlantis* on two separate flights to the station this year, STS-101 to conduct maintenance and logistics work aboard the ISS in advance of Zvezda's arrival, and STS-106, to unload supplies onto Zvezda from both the shuttle and a Russian Progress resupply vehicle. STS-106 is scheduled for launch in August, about five weeks after Zvezda's planned July launch on a Proton rocket from Baikonur.

"To me, the significance of this flight has been to demonstrate the quick response capability," said Sharon Castle,



NASA JSC Photo S99-01417

STS-101 launch package manager. "We officially decided to split this flight in January, and here we are at the end of March and we're pretty well ready to go. I'm happy we were able to demonstrate this so early in the assembly sequence."

The crew plans to transfer almost a ton of equipment from a double Spacehab

All of the space shuttles will be upgraded with the "glass cockpit," left, by 2002.

module housed at the rear of *Atlantis'* cargo bay into Zarya and Unity for use by the Expedition One crew later this year. Those logistical items include personal clothing, medical and exercise equipment, computer equipment and printers, hardware for stowage and trash management, and a centerline camera for Unity's common berthing mechanisms to which other ISS components will be mated.

Four large bags of water will also be brought from *Atlantis* into the ISS for later use. The station will weigh 2,300 pounds more after all items are delivered and replaced than it did before STS-101.

"The team has been looking forward to this flight for a long time," said Engelauf. "We think we're all ready to go fly, and we're really looking forward to the mission." ■

C O M M U N I T Y N E W S**They came, they saw, and now they want more: *JASON XI a hit***

JASON XI went flawlessly, bringing lessons of space and science to more than 3,000 students who experienced the broadcasts here from JSC. More than 1 million students observed or participated in the JASON XI adventure from other Primary Interactive Network sites around the country and via the Internet.

JSC has participated in JASON for seven years, but this is the first year the NASA space program has been part of the focus topic for the broadcast adventure. This year's project, entitled "Going to Extremes," focused on the challenges of exploration in deep space as well as in the deep sea. JSC scientists and astronauts narrated more than 50 broadcasts during JASON, highlighting space station mock-ups, crew training in the NBL, and space engineering.

The National Oceanic and Atmospheric Administration was also a partner for the event. Additional broadcast crews and argonauts, or student adventurers for the JASON Project, participated via NOAA's Aquarius Underwater Laboratory in Key Largo.

Delicia Slaughter, IMPASS, education outreach coordinator, said this year's project was unusual because the students were watching JASON at JSC, an expedition site.

"They were far more anxious this year," said Slaughter. "The fact that the astronauts and mockups were so close as the students watched them on the screens just added to their excitement. We hope the experience encouraged them to have their parents bring them back to learn more about the space program."

“Through this year’s JASON Project, we hope to have reached students all over the world with the message that it IS possible to become an astronaut, to not give up on that dream and also that space exploration is made possible not only by astronauts, but also by other types of explorers – the engineers, technicians and the whole team at NASA.”

– Dr. Bob Ballard, JASON Project founder



Photo courtesy of the JASON Foundation for Education
NASA Astronaut Yvonne Cagle, left, meets with Argonauts Adrea Robinson and Rachel Owen.

Adding to the excitement for the students was the fact that Dr. Bob Ballard, founder of the JASON Project and the discoverer of the sunken *Titanic*,

was among them as a spectator during one of the broadcasts. That was the first time Ballard, who normally is a full-time on-air host for the live broadcasts, has

ever observed the event.

"Since we were broadcasting from a PIN Site this year I just could not let the opportunity pass me by," said Ballard. "I thoroughly enjoyed seeing the excitement on the faces of the children in the audience and feeling their energy as they clapped and yelled out the answers to our questions. It helped me to really understand what parts of our programs reach students the best and what really excites them about learning."

Tim Armour, executive director for the JASON Foundation, also was on site here at JSC viewing the program.

"The JSC staff in Teague did a fantastic job of immersing the students in the space theme and keeping them involved and excited during the program," said Armour. "Since we were fortunate enough to work on camera with some great folks at NASA who really know how to reach students, I think children walked away thinking, 'Hey, maybe I can do that some day. That job really interests me.'"

Slaughter says success of this year's event can be attributed to the growing JSC team that helps execute the event and by improving on previous year's experiences.

"Our part went so well," said Slaughter. "As far as support and technical conflicts, it went flawlessly. We knew from our 'lessons learned' from 1999 that having NASA as the focus for the JASON XI, we were going to need more help. The support we received from the IMPASS team was phenomenal. Everyone stayed positive. Without their support, we would not have been able to pull it off." ■

JASON production crew aims for 'mission success'

Bringing the JASON Project science adventure to schoolchildren around the world has far-reaching rewards, but producing a two-week live broadcast is a massive feat requiring a large behind-the-scenes effort.

Seattle-based Media Arts, Inc., has coordinated the production for the past five years – traveling from the Florida Keys to Yellowstone, Iceland, Bermuda, Monterey Bay, the Peruvian Amazon and, now, to space. The company oversees other partners in the production, including MCI/WorldCom and EDS, who are responsible for the satellite uplink. Since mid-February, they've made themselves at home here at JSC, bringing in three trailers/trucks, a production crew of almost 50 people and miles of cable.

A mobile production truck behind Bldg. 9, resembling our own Mission Control Center, is where the JASON Project is brought to life. A small team inside the pitch-black truck orchestrates the live video seen each day by thousands of student viewers around the world.

Scott Munro is the "flight director," if you will. He directs the entire operation from his chair, front and center, at the production console. As he monitors the multiple incoming image sources, he simultaneously directs the "on air" hosts during their dialogues with the Argonauts and their fellow program hosts. Sitting next to him, literally his right-hand assistant, is Glenis Levine, the technical director.

Levine, like the majority of the crew members working JASON, is a free-lancer who regularly travels around the

country working a variety of assignments but makes it an annual tradition to work on JASON.

"I do it because I believe in the Project," said Levine, who is on her fourth

selects the video that is actually seen at the JASON viewing sites, sometimes changing the images every few seconds.

The production truck has three rows of consoles in the front section – Munro and

row is Nic Dugger, a Middle Tennessee State University student who for the third consecutive year, has taken time off from school to work on the JASON Project. His role this year is similar to Levine's, except on a smaller scale for sites viewing the program on only one screen or via the Internet.

In a small chamber in the middle section of the truck is the audio console. A vast deck covered by rows of knobs and buttons controls every microphone in use. The last third of the truck houses the Grass Valley Profile™ computer system that replaces traditional tape decks for storing and accessing hundreds of video clips used during the broadcasts. This system not only is much faster than tape, but also allows the operator to randomly access the stored material.

Most of the crew reports that JASON XI has been a relatively smooth production.

"We have Radio Shack here!" said Mike Durbin, MCI WorldCom technical consultant to EDS. "At least we can get parts if there is a problem. We could just as easily be in the middle of nowhere surrounded by Iguanas."

The team is happy to be somewhere a little more civilized (their adventure in the Amazon required sleeping in grass huts and featured rice and beans as the menu staple for the entire month). And they all agree there's nowhere they'd rather be.

"Just like the NASA people we've been working with, our job is a matter of teamwork" said Munro. "And we're all here because we love doing it; we believe in it." ■



NASA JSC Photo JSC2000-01895 by Bill Stafford
Production teams worked hard behind the scenes to bring the JASON Project to life. Shown here are Brian Stratton, left, a student argonaut from Galveston, with former Astronaut Dr. Kathy Sullivan talking live to student audiences all over the world.

JASON tour. "There is no other educational project like this anywhere."

Munro says he wouldn't do this project without her and if you watched for even just a few minutes, you'd see why. Throughout each show, she continuously scans the more than 40 available video 'sources' (everything from live camera feeds, taped video and graphics) and

Levine are up front. Behind them sits Barbara Ferderer, who screens the incoming e-mail questions from the viewing sites, and Carol Mark, who sets up the titles, shot descriptions and other real-time graphics seen on screen. Labels like "Dr. Ellen Baker – NASA Astronaut" are created and called up in the first few seconds Baker is on camera and uplinked almost instantly. In the last

Students Combine Wonder and KC-135 Weightlessness

By John Ira Petty

These young people were soaring, psychologically, scientifically and literally. You could see it in the way they talked about their experiments and their experiences on NASA's KC-135 "Weightless Wonder."

The college students, about 180 of them in 47 teams from across the United States, participated in the March 2000 College Student Campaign of the NASA Reduced Gravity Student Flight Opportunities Program.

They took microgravity experiments they had designed from their laboratories into the reality of weightlessness on the aircraft. They learned some valuable lessons, beginning with teamwork, creativity, scientific discipline and, in some cases, how to overcome and work through obstacles – ranging from personal discomfort to balky experiments.

The enthusiasm was evident as they got off the airplane. "It's probably the greatest program, the greatest collegiate activity I've ever been involved in," said Scott N. Ringel, University of Alabama at Huntsville. "One of my teammates had flown before, and he kind of described it, but it wasn't even close. It was just unreal."

The Johnson Space Center plane, a military version of the Boeing 707, has seats in the rear, but much of the cargo area is empty space encircled by the padded interior of the fuselage. Student



NASA JSC Photo JSC2000e08010

experiments, as many as eight per flight, are secured to the floor.

The KC-135A is used to train astronauts and test equipment. NASA's Reduced Gravity Student Flight

Opportunities Program, operated by Johnson Space Center, is in its fourth year. It is funded by the space agency and administered by the Texas Space Grant Consortium in Austin. It provides opportunities not only for college students but for community college and high school students as well. High school students will fly in April, as will community college students. A fall session will host college students.

The plane achieves

weightlessness by flying in precise up-and-down maneuvers over the Gulf of Mexico – up at a 45-degree angle, "over the top" and then down at 45 degrees. Zero gravity lasts for about 25 seconds on each flight's 30 to 40 parabolas.

Each of the college teams flew its experiment twice in March. Two team members flew on the first flight, and two others on the second flight. Journalists accompanied about half the teams to report on their experiments and activities. Each person who flew received physiological training before flying, and each experiment was carefully evaluated for safety.

Donn Sickorez, university affairs officer at Johnson Space Center, said the center does indeed touch the future with this program. "It's really good to see the kids come in. They're excited. They give you a new perspective, and a jolt of energy."

Weightlessness gave the students a new and remarkable experience. Jeran S. Hill of Alabama A&M University said the sensation really was almost like a roller coaster, but that the sensation persisted. "That was really weird." But, he continued, "I'm really enthusiastic about the program. I certainly enjoyed myself – it's worth it for the experience alone."

Julie Stahmer of the University of Michigan said that before the flight she had no idea what to expect. "It was lots of fun," she said, especially since their experiment appeared to function well. "I'd go again."

Her teammate, James Kanavage, said the experience was "completely unlike anything I expected – a lot better than I thought. The neat part was going into zero g, when things started floating by."

A lot of Johnson Space Center people work hard to make the student flights successful. They have their own rewards. John Yaniec of the Aircraft Operations Division displayed an enthusiasm as boundless as that of the students. "Everything worked really well with the kids," Yaniec said.

Mike Fox of Kelsey-Seybold who did the physiological training said the students were "enthusiastic and rarin' to go. All of them show a lot of dedication to the program. They were thrilled to be here. Several of them asked about center employment opportunities."

The students did get a good look at Johnson Space Center, and were told about the co-op programs and post-college employment opportunities. Both contractors and JSC cooperative education students sponsored activities for the students while they were in Houston.

Many students said they were impressed with what they saw. It wouldn't be surprising to see some of the March participants back at the center, perhaps as astronauts, flight controllers, scientists or engineers. ■



NASA JSC Photo JSC2000e05326

Above left: Alabama A&M University students Jeran Hill, left, and Kelly Moon, right, work on an experiment titled "Measurement of Ambient Acoustic Power Spectrum on the KC-135 and its Perturbative Effect."

Above: Montana State University-Bozeman student Connie Nelson works on an experiment on the flight behavior of bees and how growing roots react in microgravity.

Right: University of Cincinnati student Michael Volle works on a study of how to maneuver nanosatellites without on-board propulsion.



NASA JSC Photo JSC 2000-06717

What

the students said:



NASA JSC Photo JSC2000e07090

During the two weeks that we were here, we learned a lot about NASA. I know I learned a lot because I didn't realize exactly how much NASA has been doing. ... With our experiment, we learned how to work as a team.

Stacy Lawrence
Mississippi State University

This [KC-135 Student Flight Opportunities Program] is probably one of the most unique educational experiences that a college student could ever ask for. There's no other laboratory in the world that will let you go out in zero g and do some testing that is actually applicable to the space sciences and other sciences. This opportunity probably has been more useful as far as actual project experience to most of the students on this team than any other project they've done at the school.

Angie Monheim
South Dakota School of Mines & Technology



NASA JSC Photo JSC2000e05574

I really enjoyed the flight. It was remarkable. It felt like the world was falling out from underneath my feet. I want to be an astronaut, so I hope this is just the first taste of microgravity for me.

Drew Pounds
State University of West Georgia

Learning about the NASA program, the astronauts, and everything that goes on here was very interesting and valuable.

Allison Kimball
State University of West Georgia

I've wanted to be an astronaut since I was five. There's been nothing like [being in a state of weightlessness]. It was great to be able to reorient yourself. It's a physicist's dream to have arbitrary reference frame. It was just amazing. It's what I've always wanted.

Kai Miller
University of California, San Diego



NASA JSC Photo JSC2000e06587

We all learned a lot about actually getting your hands dirty and the fact that just because you draw a simple circuit doesn't mean it's going to work the next day and just because you draw something out doesn't mean you can actually build it.

Susan Ramsey
Texas A&M University



NASA JSC Photo JSC2000e06393

From this whole experience, I'm going to carry away a better understanding of engineering principles and a better understanding of what NASA is. I have a lot more drive and motivation to head toward what I thought I wanted to be but now I'm pretty sure I do want to be. It was a great learning experience.

Nathan Cobb
Embry Riddle Aeronautical University



NASA JSC Photo JSC2000e07086

This was definitely a learning experience. Number one – probably first and foremost – is working together as a team. We had a lot of team interaction. We learned how to cooperate with each other.

Jim Knohl
University of Illinois, Urbana-Champaign



NASA JSC Photo JSC2000e06453

The whole idea of being weightless was incredible. You really have no idea what to expect or what to do or how to react. To get yourself under control enough to go ahead and go through the experiment was quite an experience.

Peter Yeung
Carnegie Mellon University

Ripped from the ROUNDUP

Ripped straight from the pages of old Space News Roundups, here's what happened at JSC on this date:

1 9 6 5

At 9:24 a.m. EST, March 23, America's second series of human space flights got off to a successful start with the launching of Astronauts Virgil I. (Gus) Grissom and John W. Young on a three-orbit flight of the Earth in their two-person Gemini spacecraft.

This first Gemini flight, launched from Cape Kennedy, was designed to validate the human-machine relationship and make the Gemini program fully operational.

During the four-hour and 53-minute flight, all the major flight objectives were met. The Gemini-3 pilots maneuvered their spacecraft and changed their orbital plane around the Earth, an achievement that had never before been accomplished by a manned vehicle in space.

1 9 9 0

The Pegasus air-launched space booster successfully completed its initial launch April 5, marking the first time a privately developed launch vehicle has carried a payload into orbit.

Former Astronaut C. Gordon Fullerton commanded the NASA B-52 that carried the unusual 49-foot-long, 41,000-pound triangular-winged rocket to its launch point 60 miles southwest of Monterey, Calif., over the Pacific Ocean. After release at 43,000 feet, Pegasus followed an autonomously guided, lift-assisted trajectory into a 320 nautical mile polar orbit.

1 9 9 5

NASA's Hubble Space Telescope has helped solve a two-decade-old cosmic mystery by showing that mysterious clouds of hydrogen in space may actually be vast halos of gas surrounding galaxies.

"This conclusion runs contrary to the long-standing belief that these clouds occur in intergalactic space," says Ken Lanzetta of the State University of New York at Stony Brook.

The existence of such vast halos, which extend 20 times farther than the diameter of a galaxy, might provide new insights into the evolution of galaxies and the nature of dark matter.

JSC and center director star at VPPPA Conference

By Mary Peterson

Scarcely one year ago, JSC was a mere wannabe on the VPP Star scene. Who could have foreseen the rousing, standing ovation Center Director George Abbey would receive for his keynote address at the VPP Participant's Association Conference in March in Albuquerque, NM, where he described JSC's (sometimes bumpy) road to the coveted Star status. JSC, for all its trials and vast employee population, unique among VPP sites, had, indeed, arrived.

Clearly mesmerized by the achievements of the space program, the audience of some 1,000 delegates listened raptly as Abbey recounted the amazing exploits of the past and gave them a peek into what the future will bring. Yet, for all the glamour and adventure that marked the early parts of his talk, the director's demeanor changed visibly when he

broached the subject of safety, something near to his heart. Not just safety for the shuttle flights and the astronauts, but safety for everyone connected with the space program, and their families.

"Our program is about people," Abbey said. "I showed you a lot of pictures of facilities and a lot of airplanes and buildings, and all those kinds of things, but it is the people that really make the difference. Our very success depends on the well-being of our workforce." Abbey recalled how the safety program, although well founded for the shuttle missions and astronauts, had been somewhat neglected in terms of the larger JSC population. Until, that is, on the fateful day in April of 1994 when the center fell victim to an accidental release of orange vapor, later identified as nitrogen tetroxide. From that date forward, every activity was geared to safety excellence, and, ultimately, achieving VPP Star status.

"Now," said Abbey, "we need to extend our safety program from the workplace: to-and-from work, and home. We've come a long way, but we have a long way yet to go. We are proud to be a part of VPP because we think it is a very fine program. We hope to achieve 'superstar' status someday, and we are going to work very hard to do that," he promised.

JSC was also honored with a 'Star Among Stars' award for having injury rates 50 percent below that of the Bureau of Labor Statistics average. JSC narrowly missed (by only 4 percentage points) achieving the "Superstar Among Stars" rank. This designates a 75 percent better record than the BLS average.

The nearly 100 JSC Team delegates at the conference learned much about maintaining Star certification and how to expand the safety program, information that will be shared with the center-at-large in the coming weeks and months. ■

Keep those Roundups!

Are you one of those loyal space enthusiasts that has a secret stash of old *Roundups*? You're not alone. Lots of people, both former and current JSC employees, maintain a collection of the 39-year-old publication as personal memorabilia. Added bonus? In addition to their value as a historic keepsake, the documents are now a recognized collector's item in the marketplace. One of our readers recently spotted a collection of the NASA publication for sale on the popular online auction site, eBay. An anonymous seller relinquished their accumulation of the newsletter, 543 issues dating from 1972 to 1999, to a bidder for \$150. ■

GILRUTH CENTER NEWS

Sign up policy:

All classes and athletic activities are on a first-come, first-served basis. Sign up in person at the Gilruth Center and show a yellow Gilruth or weight room badge. Classes tend to fill up two weeks in advance. Payment must be made in full, cash or by check, at the time of registration. No registration will be taken by telephone. For more information, call x33345.

Gilruth badges:

Required for use of the Gilruth Center. Employees, spouses, eligible dependents, NASA retirees and spouses may apply for photo identification badges from 7:30 a.m.-9 p.m. Monday-Friday and 9 a.m.-2 p.m. Saturdays. Cost is \$10. Dependents must be between 16 and 23 years old.

Open from 6:30 a.m.-10 p.m. Monday-Thursday, 6:30 a.m.-9 p.m. Friday, and 9 a.m.-2 p.m. Saturday. Contact the Gilruth Center at (281) 483-3345. <http://www4.jsc.nasa.gov/ah/exceaa/Gilruth/Gilruth.htm>

Nutrition intervention program: Six-week program includes lectures, a private consultation with the dietitian and blood analysis to chart your progress. Program is open to all employees, contractors and spouses. For details call Tammie Shaw at x32980.

Defensive driving: One-day course is offered once a month at the Gilruth Center. Pre-registration required. Cost is \$25. Call for next available class.

Stamp club: Meets every second and fourth Monday at 7 p.m. in Rm. 216.

Weight safety: Required course for employees wishing to use the Gilruth weight room. Pre-registration is required. Cost is \$5. Annual weight room use fee is \$90. The cost for additional family members is \$50.

Exercise: Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for eight weeks.

Step/bench aerobics: Low-impact cardiovascular workout. Classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks. Kristen Taraszewski, instructor.

Yoga: Stretching class of low-impact exercises designed for people of all ages and abilities in a Westernized format. Meets Thursdays 5-6 p.m. Cost is \$32 for eight weeks. Call Darrell Matula, instructor, at x38520 for more information.

Ballroom dancing: Classes meet Thursdays from 6:30-7:30 p.m. for beginner, 8:30-9:30 p.m. for intermediate and 7:30-8:30 p.m. for advanced. Cost is \$60 per couple.

Country and western dancing: Beginner class meets 7-8:30 p.m. Monday. Advanced class (must know basic steps to all dances) meets 8:30-10 p.m. Monday. Cost is \$20 per couple.

Fitness program: Health-related fitness program includes a medical screening examination and a 12-week individually prescribed exercise program. For details call Larry Wier at x30301.

Aikido: Martial arts class for men and women meets 5-6 p.m. Tuesdays and Wednesdays. No special equipment or knowledge is needed to participate. Aikido teaches balance and control to defend against an opponent without using strength or force. Beginning and advanced classes start each month. Cost is \$35 per month.

TICKET WINDOW

The following discount tickets are available at the Exchange Stores

General Cinema Theaters	\$5.50
Sony Loew's Theaters	\$5.50
AMC Theaters	\$5.00
Fiesta Texas	adult . . . \$20.50 . . . child (under 48 inches) . . . \$17.25
Astroworld Early Bird (use by June 18)	\$17.25
Astroworld	1 day . . . \$21.00 . . . 2 day . . . \$31.00
WaterWorld	\$12.00
Moody Gardens (2 events) (does not include Aquarium Pyramid)	\$10.75
Moody Gardens (Aquarium only)	\$9.25
Sea World	adult . . . \$29.00 . . . child (3-11 years) . . . \$19.25
Space Center Houston	adult . . . \$11.00 . . . child (age 4-11) . . . \$7.25 (JSC civil service employees free.)
Space Center Houston annual pass	\$18.75
Splash Town	1 day . . . \$13.00 . . . Season Pass . . . \$37.50
Postage Stamps (book of 20)	\$6.60

Please bring your driver's license to pay by personal check.

Exchange Store hours

Monday-Friday
Bldg. 3 7 a.m.-4 p.m.
Bldg. 11 9 a.m.-3 p.m.

- All tickets are nonrefundable.
- Metro tokens and value cards are available.
- Booksigning with Mario Livio author of *The Accelerating Universe* Tuesday, April 25, Building 3 Cafeteria, 9 a.m. -11:30 a.m.

For additional information, please call x35350.



Ishmel, Turnbough get Secretarial Excellence Awards

Carlise Ishmel of the Office of Procurement and Linda Turnbough of the Space Shuttle Program Office each recently received the Marilyn J. Bocking Secretarial Excellence Award in recognition of their exceptional contributions to the effective operation of the Johnson Space Center through professional competence and personal dedication.

Ishmel was recognized in February for her contributions as secretary to the deputy directory and assistant director of the Office of Procurement. This position requires her to have the first interface with all levels of management from JSC, other NASA centers, and many aerospace contractors. This first impression is an integral part of the visitor's thoughts, and it is essential that the right tone be established. Ishmel welcomes the visitors with enthusiasm and facilitates their visit with this organization.

Ishmel is responsible for coordinating and proofreading, for grammatical and procedural compliance, all procurement correspondence scheduled to go to center management. During the past year, the quality and timeliness of the procurement correspondence going forward has been uniformly consistent with standards. This is a result of her understanding of the process, her ability to work with the office secretaries, the program and center correspondence control activities to accomplish the work in a highly efficient manner.



Linda Turnbough, left, and Carlise Ishmel

Composite of NASA JSC Photos JSC2000e08235 and 08239

Ishmel's organizational skills are tested daily as she often juggles to post meetings to three calendars simultaneously. Her sense of diplomacy and tact are equally tested as she attempts to accommodate the many requests for time on the calendars of the directorate's staff. She has acquired the skill to screen, prioritize, and resolve any issues surrounding the organization of the daily work schedule.

The deputy director of procurement serves as the center ombudsperson and receives an average of 200 calls per month

from across the United States and international locations concerning procurement activities. Through her exposure to procurement documents, Ishmel has acquired a general knowledge of the procurement process.

Turnbough was recognized in March for her contributions as secretary to the manager, Space Shuttle Systems Integration Office. Her responsibilities represent a broad spectrum of administrative and technical skills. She efficiently handles routine office functions while seamlessly establishing

office operating procedures and protocols to meet the ever-changing environment dictated by fast-paced information management and contractual systems updates.

As the technical support staff within the Space Shuttle Systems Integration Office has been reduced due to retirements and transfers, Turnbough has willingly expanded her normal clerical and administrative responsibilities to include technical support to the office managers. She coordinates the efforts required to support the numerous space shuttle and International Space Station integration meetings managed by her office. She provides a process for documenting and tracking action items and provides for the preparation and maintenance of Flight Readiness Review documentation to support Space Shuttle Program milestones.

Turnbough actively supports the goals and objectives of JSC and the Space Shuttle Program by her regular participation as a volunteer during space shuttle missions in the Mission Control Center, Inspection Day, Safety and Total Health Day, and Open House. Her "can-do" attitude and care for personal safety and well-being are demonstrated by her contributions of time and effort as office fire warden and coordinator for the office's Voluntary Protection Program activities. ■

JSC retiree gets first AIAA Sustained Service Award

Retired JSC employee Norman Chaffee has been named one of 14 recipients nationally of the first American Institute of Aeronautics and Astronautics Sustained Service Awards for 2000. He was selected for the award in recognition of his sustained, significant service and consistent contributions to the AIAA.

"It is certainly satisfying to be recognized by my colleagues and the members of the AIAA by my selection to receive one of these meaningful new awards. Membership in AIAA and the opportunity it has given me to serve my profession over the years has been an honor and personally rewarding to me," Chaffee said.

A member of the AIAA since 1965, Chaffee served two terms as the organization's secretary of the Houston Section, one term as councilor, and one term as vice-chairman. He later served as section chairman from 1980 to 1981. He has served the Houston Section in a variety of volunteer positions throughout his career, and currently continues with a regular column in the Section's monthly newsletter.

Following his retirement from NASA in September 1996 after more than 30 years of service at JSC, Chaffee joined InDyne, Inc. as an education outreach assistant in JSC's Public Affairs Office. In this position, he is responsible for planning and implementing

educational outreach programs for students and teachers at all grade levels.

Chaffee served as deputy chief of the Automation, Robotics and Simulation Division from 1991 until his retirement. Previous assignments include manager of Systems Engineering and Integration for the Lunar/Mars Exploration Office from 1990 to 1991; deputy chief of the Propulsion and Power Division from 1980 to 1984 and 1987 to 1990; and assistant manager for Integration in the Systems Engineering and Integration Office of the Space Station Program Office from 1984 to 1987.

Chaffee will receive the award in May at the AIAA's Houston Section meeting. ■



NASA JSC Photo JSC2000e06310

Norm Chaffee

Employees earn Space Act Awards

Last year, NASA Headquarters recognized the work of a number of JSC employees with Space Act monetary awards. The awards were presented during a ceremony March 20. The following is a list of recipients.

TECH BRIEF AWARDS (\$150)

Eugene K. Ungar	<i>Technique for Control of Gas Generation in an Anaerobic Biological Reactor</i>
Karen D. Pickering	<i>Vapor Compression Solar Refrigerator Without Batteries</i>
Michael K. Ewert	<i>Rapid Prototype Production</i>
Scott A. Swan	<i>Intranet Electronic Drawing Review System (EDRS)</i>
Charles L. Salkowski	<i>HyperMan-On-Line Hypermedia Documentation System</i>
Christopher J. Ortiz	<i>Electro-Mechanically Actuated Magnetic Ring with Load Sensing Feedback and Closed Loop Control Docking/Berthing</i>
Lui Wang	<i>Portable Cell Phone Repeater</i>
James L. Lewis	<i>NASA QWhiz</i>
Patrick W. Fink	<i>Automated Multi-Sorbent Tube Air Sampler (AMTAS)</i>
Robert O. Shelton	<i>Analyzing Water Samples for Non-Volatile Organic Compounds by Ion Exclusion Chromatography</i>
John T. James	<i>Skin Impedance Imaging System</i>
Richard L. Sauer	<i>Intra-Aural Probe</i>
Albert Wetterstroem	<i>Medium Frequency Pseudo Noise Radar</i>
Albert Wetterstroem	<i>Microwave Treatment System for Prostate Cancer and Hyperplasia</i>
G. Dickey Arndt	
G. Dickey Arndt	

PATENT APPLICATION AWARDS (\$250)

William C. Schneider	<i>Energy Absorbing Protective Shroud</i>
William C. Schneider	<i>Advanced Structural and Inflatable Hybrid Spacecraft Module</i>
Chin H. Lin	
Horacio M. de la Fuente	
Gregg S. Edeen	
Linda F. Hess	
James D. Lester	
Jasen L. Raboin	
Kriss J. Kennedy	
Richard H. Malecki	
Bernard J. Rosenbaum	<i>Tubular Coupling</i>
Christopher S. Lovchik	<i>Compact Dexterous Robotic Hand</i>
Ted W. Tsai	<i>Compact, Stiff, Remotely-Actuable Quick-Release Clamp</i>
Richard L. Sauer	<i>Microwave Powered Sterile Access Port</i>
Daniel L. Feedback	<i>A Uni-Directional Cell Stretching Device</i>
Duane L. Pierson	<i>Evaluation of Biofilms and the Effects of Biocides Thereon</i>
Laksmi Putcha	<i>Preservation of Liquid Biological Samples</i>
Scott M. Smith	<i>A Urine Preservative</i>

SOFTWARE OF THE YEAR AWARD RUNNER-UP (\$2,500)

S. Michael Goza	<i>ENIGMA Software Tools</i>
Sharon P. Goza	

SPACE ACT BOARD AWARDS

Bernard J. Rosenbaum	<i>Rotary Blood Pump Ventricular Assist Device (VAD)</i> (\$2,000)
Robert O. Shelton	<i>NASA Qwhiz</i> (\$500)

PEOPLE on the **MOVE****Human Resources reports the following personnel changes:****Key Management Assignments**

Bill Parsons was named deputy center director.

Joe Chang was selected as manager, Space Operations Business Office, Space Operations Directorate.

Paul Shack was named manager, Systems Engineering Office, Engineering Directorate.

Bill Roberts was selected as chief, International Training Integration Branch, Space Flight Training Division, Mission Operations Directorate.

Paul Bertsch was selected as chief, Flight Design Requirements and Integration Office, Flight Design and Dynamics Division, Mission Operations Directorate.

Karen Wyont was selected as chief, Supply and Support Services Branch, Logistics Division, Center Operations Directorate.

Marge Davis was named chief, Property and Equipment Branch, Logistics Division, Center Operations Office.

Additions to the Workforce

Lanny Plaisance joins the Power Systems Branch, Energy Systems Division, Engineering Directorate, as an electrical power systems engineer.

Promotions

Carlise Ishmel was selected as senior secretary in the Office of Procurement.

Silvia Hanagriff was selected as a traffic management specialist in the Transportation Branch, Logistics Division, Center Operations Directorate.

Carolyn Ochoa was selected as an accounts receivable specialist in the Resource Control and Reimbursables Branch, Logistics Division, Office of the Chief Financial Officer.

Dorothy Workman was selected as senior secretary in the Office of the Chief Financial Officer.

Jana Schultz was selected as lead secretary in the Space Station Payloads Office, International Space Station Program Office.

Reassignments Between Directorates

Lee Graham moves from the International Space Station Program Office to the Systems Management Office.

Debra Yockov moves from the Mission Operations Directorate to the Systems Management Office.

Venessa Jankowski moves from the International Space Station Program Office to the Office of Procurement.

Tim Bond, Joe Chambliss, Arnold Levine, Kornel Nagy, Jim Rueter, and John Zipay move from the International Space Station Program Office to the Engineering Directorate.

Michael Garske moves from the Mission Operations Directorate to the Space Shuttle Program Office.

Stuart McClung, Ken Poast, and Kevin Templin move from the Engineering Directorate to the Space Shuttle Program Office.

Vince Berend and Jeff Phillips move from the Safety, Reliability, and Quality Assurance Office to the International Space Station Program Office.

Greg Lestourgeon moves from the Center Operations Directorate to the EVA Project Office.

Reassignments Between Centers

Heather Moncrief moves to the White Sands Test Facility.

Randy Galloway moves to the Kennedy Space Center.

Retirements

Leo Monford of the Engineering Directorate.

O'Keefe Sullivan of the International Space Station Program Office.

Resignations

Yvette Garner of the Office of Procurement.

NASA BRIEFS**NASA RENAMES NEAR SPACECRAFT**

The NASA satellite conducting the first-ever close-up study of an asteroid will be renamed to honor Dr. Eugene M. Shoemaker, a legendary geologist who influenced decades of research on the role of asteroids and comets in shaping the planets. The Near Earth Asteroid Rendezvous (NEAR) spacecraft, currently orbiting asteroid 433 Eros more than 145 million miles from Earth, will now be known as NEAR Shoemaker.

"Gene Shoemaker was an inspirational, charismatic pioneer in the field of interplanetary science," said Dr. Carl B. Pilcher, director of Solar System Exploration at NASA Headquarters. Pilcher announced the new name during the Lunar and Planetary Science Conference held recently in Houston. "It is a fitting tribute that we place his name on the spacecraft whose mission will expand on all he taught us about asteroids, comets and the origins of our solar system."

Shoemaker died in a 1997 car accident in the Australian outback while on an annual study of asteroid impact craters. With his wife and research partner, Carolyn, Shoemaker was part of the leading comet discovery team of the past century, perhaps most famous for finding the comet (Shoemaker-Levy 9) that broke up and collided with Jupiter in 1994. Shoemaker was a key member of the 1985 working group that first studied the NEAR mission, defining its science objectives and designing a conceptual payload. Many of the group's recommended instruments were included in the actual spacecraft, which only a month into its year-long orbit of Eros is already returning fascinating data on the asteroid's surface and geology.

The first in NASA's Discovery Program of low-cost planetary missions, NEAR launched from Cape Canaveral Air Station on February 17, 1996. After a four-year journey that included flybys of Earth (January 1998) and asteroids Mathilde (June 1997) and Eros (December 1998), NEAR began orbiting Eros on February 14, 2000. The car-sized spacecraft will observe the asteroid from various distances – coming within several miles of the surface – before the mission ends in February 2001.

VIEW INSIDE MARS REVEALS BURIED CHANNELS

Some of Mars' best kept secrets, long buried beneath the surface of the red planet, were recently revealed by instruments on NASA's Mars Global Surveyor spacecraft.

New observations of Mars reveal that the planet's flat northern lowlands were an early zone of high heat flow that later may have been the site of rapid water accumulation, according to a view of the Martian interior generated using data from Mars Global Surveyor. Elevation and gravity measurements, which have been used to probe beneath the surface of Mars, indicate a period of rapid cooling early in Martian history, and evidence for large, buried channels that could have formed from the flow of enormous volumes of water.

This global view of the Martian interior was generated from gravity measurements with the Radio Science experiment and elevation measurements from the Mars Orbiter Laser Altimeter instruments.

DATES & DATA**April 11**

Aero Club meets: The Bay Area Aero Club will meet at 7 p.m. at the Houston Gulf Airport clubhouse at 2750 FM 1266. For details contact Larry Hendrickson at x32050.

April 12

Astronomy seminar: The JSC Astronomy Seminar Club will meet at noon April 12, 19 and 26 in Bldg. 31, Rm. 248A. For details contact Al Jackson at x35037.

IAAP meets: The Clear Lake/NASA Chapter of the International Association of Administrative Professionals will meet at 5:30 p.m. at Bay Oaks Country Club. Cost is \$16. For reservations contact Tami Barbour at (281) 488-0055, x238.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters will meet at 11:30 a.m. April 12, 19 and 26 at United Space Alliance, 600 Gemini. For details contact Patricia Blackwell at (281) 280-6863.

April 13

Airplane club meets: The Radio Control Airplane Club will meet at 7 p.m. at the Clear Lake Park building. For more information contact Bill Langdoc at x35970.

★Communicators Meet: The Clear Lake Communicators, a Toastmasters International club, will meet April 13, 20 and 27 at Wyle Laboratories, 1100 Hercules, Suite 305. For details contact Allen Prescott at (281) 282-3281 or Richard Lehman at (281) 280-6557.

MAES meets: The Society of Mexican-American Engineers and Scientists will meet at 11:30 a.m. in Bldg. 16, Rm. 111. For more information contact George Salazar at x30162.

OUT&ABOUT ★

Toastmasters can help you lose the fear of public speaking and learn skills that will help you be a more successful communicator. You'll be a better listener and will easily lead teams and conduct meetings. Shown here, left to right, are Richard Lehman, Vi Truong, Lisa Brown, and Gwen Gilliam, officers of the Clear Lake Communicators, a Toastmasters International club, at a recent meeting. For more information contact Lehman at (281) 280-6557.

STA Lecture: The Society for Software Quality presents *How the Shuttle Training Aircraft Helps the Astronauts*. Alyson Hickey, flight simulation engineer, will present an overview of the Shuttle Training Aircraft and its software system at noon in the United Space Alliance auditorium, 1150 Gemini Blvd. The brown bag luncheon is free to members, \$5 to nonmembers. For reservations contact Renne Peterson at 281-282-4392 by Tuesday, April 11.

SPACE CENTER Roundup

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